

STATE OF SOUTH CAROLINA

(Caption of Case)

195597  
BEFORE THE  
PUBLIC SERVICE COMMISSION  
OF SOUTH CAROLINA

COVER SHEET

DOCKET

NUMBER: 2008 - 196 - E

(Please type or print)

Submitted by: Ronald P. Wilder

Address: 707 Tra falgar Dr.

Columbia, SC 29210

SC Bar Number: \_\_\_\_\_

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Email: \_\_\_\_\_

NOTE: The cover sheet and information contained herein neither replaces nor supplements the filing and service of pleadings or other papers as required by law. This form is required for use by the Public Service Commission of South Carolina for the purpose of docketing and must be filled out completely.

DOCKETING INFORMATION (Check all that apply)

☐ Emergency Relief demanded in petition

☒ Request for item to be placed on Commission's Agenda expeditiously

☒ Other: Include testimony in proceedings \$ in this docket

INDUSTRY (Check one)

NATURE OF ACTION (Check all that apply)

☐ Electric

☐ Electric/Gas

☐ Electric/Telecommunications

☐ Electric/Water

☐ Electric/Water/Telecom.

☐ Electric/Water/Sewer

☐ Gas

☐ Railroad

☐ Sewer

☐ Telecommunications

☐ Transportation

☐ Water

☐ Water/Sewer

☐ Administrative Matter

☐ Other:

☐ Affidavit

☐ Agreement

☐ Answer

☐ Appellate Review

☐ Application

☐ Brief

☐ Certificate

☐ Comments

☐ Complaint

☐ Consent Order

☐ Discovery

☐ Exhibit

☐ Expedited Consideration

☐ Interconnection Agreement

☐ Interconnection Amendment

☐ Late-Filed Exhibit

☐ Letter

☐ Memorandum

☐ Motion

☐ Objection

☐ Petition

☐ Petition for Reconsideration

☐ Petition for Rulemaking

☐ Petition for Rule to Show Cause

☐ Petition to Intervene

☐ Petition to Intervene Out of Time

☒ Prefiled Testimony

☐ Promotion

☐ Proposed Order

☐ Protest

☐ Publisher's Affidavit

☐ Report

☐ Request

☐ Request for Certification

☐ Request for Investigation

☐ Resale Agreement

☐ Resale Amendment

☐ Reservation Letter

☐ Response

☐ Response to Discovery

☐ Return to Petition

☐ Stipulation

☐ Subpoena

☐ Tariff

☐ Other:

RETURN DATE: OK D. Duke  
SERVICE: OK D. Duke

Oct. 17, 2008

The Honorable Charles Ferrini

Chief Clerk and Administrator  
Public Service Commission of South Carolina  
101 Executive Center Drive South 100  
Columbia, S.C. 29219

SC PUBLIC SERVICE  
COMMISSION

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Dear Mr. Ferrini:

Here is the testimony of Mr. Ron Wilder who will be my witness at the proceeding Docket No. 2008-196 E.

In the event that I'm having health problems, I may not be able to conduct the questioning of Mr. Wilder or take part in the proceeding. I request that Pam Greenlaw do so in my place.

I, however, want very much to take part and send this letter only to let you know that I have asked Ms. Greenlaw to fill in if necessary.

Thank you for assistance.

Sincerely,

Rick Thomas

1339 Simbler Rd

Columbia, S.C. 29206 tel. 782-3000

Pamela Greenlaw

1001 Notan Rd.

Columbia, S.C. 29229

DIRECT TESTIMONY OF DR. RONALD P. WILDER  
ON BEHALF OF INTERVENOR MS. RUTH THOMAS

DOCKET 2008-196-E

Preliminary draft of intended testimony October 16, 2008

Q. PLEASE STATE YOUR NAME, ADDRESS AND POSITION

A. My name is Ronald P. Wilder and my address is 707 Trafalgar Drive, Columbia SC 29210. At present I am Distinguished Professor Emeritus of Economics in the Moore School of Business, University of South Carolina and also serve as an economics consultant.

My educational background includes earning the Ph.D. in economics at Vanderbilt University in 1969. I served as a professor on the economics faculty at the University of South Carolina from 1970 to 2006, at which point I became emeritus professor. I have taught courses and conducted research in the areas of industrial organization, regulation and deregulation, managerial economics and health economics. My published work includes papers on the demand for electricity, the nuclear industry, and deregulation of the electricity industry.

Q. UPON WHAT INFORMATION IS YOUR TESTIMONY BASED?

My testimony is based upon information found in the economics literature, trade journals about utilities and the nuclear industry, unpublished materials accessible by the Internet, and information included in the Web Sites of the Nuclear Regulatory Commission, the Energy Information Administration, and the South Carolina Public Service Commission.

Q. WHAT SUBJECTS ARE DISCUSSED IN YOUR TESTIMONY?

A. My testimony will address the areas of construction cost uncertainty and operating cost uncertainty of the proposed reactors. In addition, I will discuss the cost competitiveness of nuclear generation of electricity in comparison with alternative fuels and with incentives for conservation.

COST UNCERTAINTY IN CONSTRUCTION COSTS

Q. WHAT ARE THE BASIC FACTS THAT UNDERLY YOUR ANALYSIS OF COST UNCERTAINTY IN CONSTRUCTION COSTS OF THE REACTORS?

A. First, the Westinghouse AP1000 reactor has never before been built. In that sense, it exists on paper but not in the flesh. The Nuclear Regulatory Commission (NRC) has issued a design certification for the AP1000, and SEC&G has applied for a combined

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construction and operating license (COL) for the reactors being proposed, but no AP1000 reactor in the U. S. has yet received the COL. Further, Westinghouse has submitted an application for an amended design certification for the AP1000 to the NRC, which is currently under review.

Second, no new nuclear power generation reactor has been constructed in the United States since about 1990, with the exception of a reactor with a 1973 construction license, at which construction has recently resumed.

**Q. WHAT ARE THE IMPLICATIONS OF THESE BASIC FACTS FOR COST UNCERTAINTY IN REACTOR CONSTRUCTION?**

A. With any new technology, construction costs tend to decline with experience. The concept of the learning curve or experience curve, well established in managerial economics, applies to construction projects. The learning curve concept states that unit cost tends to decline as the cumulative number of units built increases. In the case of nuclear reactors, this learning effect would apply to the structures as well as to the reactor mechanical components and to the control systems. One study of learning in other production technologies found that unit costs declined by 20 to 30 percent each time cumulative output doubled. Learning effects also apply to regulatory delay and its effects on construction costs.

The implication of learning effects is that reactor construction costs should decrease as the cumulative number of a new design increases. The lack of experience in the construction of the AP1000 reactor design makes the cost of early units built likely to be much higher than that of later units, and also subject to more cost uncertainty due to the absence of information about design and construction problems.

This effect of the lack of experience on construction cost is made worse by the scarcity of engineers and technicians with recent experience, resulting from the recent dormancy of nuclear reactor construction in the U. S.

**Q. WHAT ARE THE IMPLICATIONS OF THESE BASIC FACTS FOR COST UNCERTAINTY IN OPERATING COSTS?**

A. One major source of uncertainty in the operating costs of nuclear generation is that associated with the design and startup of a new reactor technology such as the AP1000. As reported in a 2006 paper by MIT Professor Paul Joskow, plant capacity factors of the 100 or so reactors currently in operation has increased from 60% in the late 1980's to close to 90% in recent years, reflecting the effects of experience as well as changes in ownership associated with merchant generation. This increase in plant capacity factors has been associated with substantial reductions in operating and maintenance costs per unit over this time period, and has also reduced fixed capital costs per unit. The implication of this history is that the capacity factors of the first several units built in the new AP1000 technology are likely to be much lower than that of later units. Regulatory action and regulatory delay are also likely to be much more important for the first several units, resulting in lower plant capacity factor and increased operating costs.

**Q. WHAT ARE YOUR CONCLUSIONS ABOUT COST UNCERTAINTY?**

My primary conclusion is that it is much more difficult to forecast the construction costs and operating costs for a new technology in comparison to basing cost estimates on the experience of plants of similar technology already in operation. Thus, the Commission should recognize that wide bands of confidence should be placed around the predicted construction and operating cost estimates included in the application in this docket. It should keep in mind that cost overruns and construction delays were very common for nuclear plants built in the 1970s and 1980s. In comparing the costs of these nuclear reactors and their electricity generation with alternative means of satisfying future electricity demand growth, the Commission should add a cost inflation factor to the new reactor technology. Failing to do that relies too heavily on the optimistic cost forecasts produced by Westinghouse.

**COST COMPETITIVENESS OF NUCLEAR GENERATION  
WITH OTHER TECHNOLOGIES**

**Q. WHAT IS YOUR OPINION ABOUT HOW COST COMPETITIVE THE  
PROPOSED NUCLEAR GENERATION WILL BE WITH OTHER TECHNOLOGIES  
AND FUELS, INCLUDING CONSERVATION INCENTIVES?**

A. Relying on a 2006 paper by Professor Joskow of MIT, coal generation is likely to yield lower costs than nuclear generation, based on the operating experience of existing nuclear and coal plants and on the predicted capital costs of those plants. He estimates that nuclear generation (in 2002 \$) could produce electricity at a levelized cost of about 5.2 cents per kWh, as compared to about 3.5 cents per kWh for coal generation. Natural gas generation, once thought to be competitive with coal generation, is not cost competitive at recent price levels for natural gas.

This cost comparison may not fully take into account the cost uncertainty and regulatory delay associated with the new nuclear technology. In other words, nuclear generation could be even less cost competitive with coal than suggested by Professor Joskow's estimates.

Offsetting the cost disadvantage of nuclear generation is its more favorable carbon emission performance relative to coal generation. What is the monetary value of this emission performance advantage of nuclear generation? This is difficult to know, because current public policy at both the federal and state levels has not taken a strong policy position mandating the reduction of carbon emissions. It appears likely that the federal government will eventually establish such a policy, but at present it is at the discussion level.

**Q. WHAT IS YOUR OPINION ABOUT THE COST COMPETITIVENESS OF  
NUCLEAR GENERATION WITH ENERGY CONSERVATION AND INCENTIVES  
FOR ENERGY CONSERVATION?**

A. To the extent that greater energy conservation is achieved, smaller increases in electricity generating capacity are required. Some federal incentives in the form of tax credits and deductions were provided in the Energy Policy Act of 2005. Some conservation incentives at the state level have also been implemented, but they have been relatively minor. It appears likely that stronger incentives for conservation could reduce the growth rate of electricity demand.

In my opinion, the Commission should consider energy conservation incentives as an alternative to, or supplement for, increases in base load generating capacity. South Carolina does not have a strong tradition in this area. More could be done. As Amory Lovins has long advocated: “Negawatts are better than Megawatts.”

That concludes my testimony.

STATE OF SOUTH CAROLINA

Docket # 2008-196-E )  
)  
The Combined Application of South Carolina )  
Electric and Gas Company for a Certificate of )  
Environmental Compatibility and of Public )  
Convenience and Necessity for a Base Load )  
Review Order for the Construction and Operation )  
of a Nuclear Facility in Jenkinsville, South Carolina )

CERTIFICATE OF  
SERVICE

By this Certificate of service I am documenting that I have caused the Parties of Record listed below to be served copies of the Letter concerning my case of hardship from handicapping conditions in the PSC hearings for the above named docket via electronic email and first class mail or hand delivery.

Sincerely,

*Ruth Thomas*  
Ruth Thomas

*Oct. 17, 2008*

Service List of Parties of Record:

Nanette Edwards, Counsel  
Shannon Bowyer Hudson, Counsel  
K. Chad Burgess, Senior Counsel  
Belton T Zeigler, Counsel  
Mitchell Willoughby, Counsel  
Scott Elliott, Counsel  
E. Wade Mullins, III, Counsel  
Damon E. Xenopoulos, Esquire,  
Robert Guild, Counsel

Mildred McKinley  
Joseph Wojcicki  
Lawrence Newton  
Joe Wojcicki  
Ruth Thomas  
Maxine Warshauer

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